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(54) Title: WEIGHT BASED PEDIATRIC SYRINGE SYSTEM

(57) Abstract: A weight based pediatric syringe system (10), having a syringe with a barrel (14). The barrel (14) has at least one scale with units of volume (20) and units of mass (22). The syringe has a plunger (12). The syringe has a luer lock system (17), or a needle (18). The weight based pediatric syringe system (10) is designed to accurately graduate a volume of drugs and / or medications with a specific concentration to be administered, whereby the units of volume are directly proportionate to the units of mass based on a mass of a patient.

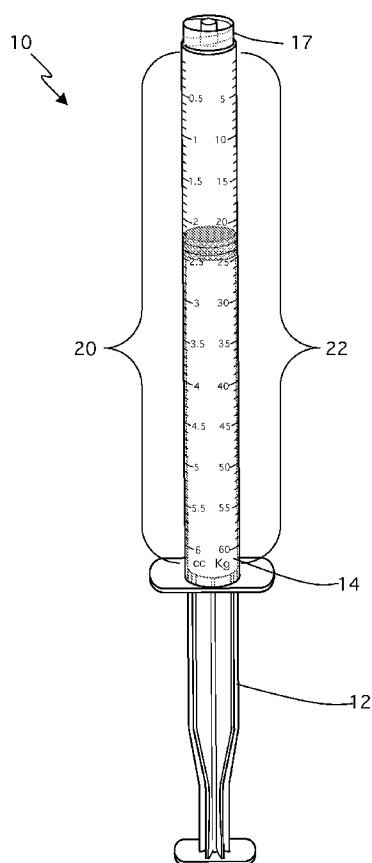


Fig. 5





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SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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I. TITLE: WEIGHT BASED PEDIATRIC SYRINGE SYSTEM**II. FIELD OF THE INVENTION**

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The present invention relates to syringes, and more particularly, to weight based pediatric syringe systems.

III. DESCRIPTION OF THE RELATED ART

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It is well known that for medical care providers, the life of a patient sometimes depends on administering drugs and/or medications at specific times with precise accuracy. Prior art teaches medical care providers having to calculate proper drug and/or medication dosages to administer into patients. This calculation typically requires that a medical care provider figure out a related volume of a dosage to then determine which syringe will be the most appropriate for an accurate measurement and drug and/or medication administration.

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Applicant is not aware of any prior art suggesting the novel features of the present invention. Specifically, Applicant is not aware of any accurately graduated syringes with markers indicating weight-based administration of a given drug and/or medication, at system-wide standard concentrations to accurately deliver drugs and/or medications during cardiac arrests or emergency care settings, thus saving lives.

IV. SUMMARY OF THE INVENTION

The present invention is an accurately graduated syringe, with markers indicating weight-based administration of a given drug and/or medication, at system-wide standard concentrations. The present invention is ground breaking, specifically in pediatric medicine. The present invention provides medical care providers with a weight based pediatric syringe system to accurately deliver drugs and/or medications during cardiac arrests or emergency care settings, thus saving lives.

More specifically, the present invention is a weight based pediatric syringe system, comprising a syringe having a barrel. The barrel comprises at least one scale having units of volume and units of mass. The syringe comprises a plunger. The syringe comprises a luer lock system, or may comprise a needle. The present invention is designed to accurately graduate a volume of drugs and/or medications with a specific concentration to be administered, whereby the units of volume are directly proportionate to the units of mass based on a mass of a patient.

In a preferred embodiment, the barrel is color-coded to match a drug and/or medication label color code. The plunger may also be color-coded to match a drug and/or medication label color code. The present invention is drug and/or medication specific. The drugs and/or medications can at least specifically treat cardiac arrest, seizure, sedation, and/or cardiac arrhythmia. Optionally, the barrel and/or plunger is marked with a specific drug and/or

medication for administration of the specific drug and/or medication.

The at least one scale having the units of volume is in cubic centimeters or milliliters. However, any other units of volume aside from centimeters or milliliters may also be used. The at least one scale having the units of mass is in kilograms or pounds. However, any other units of mass aside from kilograms or pounds may also be used.

The units of volume to the units of mass for epinephrine 1:10,000 is 0.1 cc/kg or equivalent units of volume and units of mass thereof. The units of volume to units of mass for amiodarone 50 mg/cc concentration is 0.1 cc (5 mg/kg) or equivalent units of volume and units of mass thereof.

It is therefore one of the main objects of the present invention to provide a weight based pediatric syringe system that is an accurately graduated syringe.

It is another object of this invention to provide a weight based pediatric syringe system with markers indicating weight-based administration of a given drug and/or medication, at system-wide standard concentrations.

It is another object of this invention to provide a weight based pediatric syringe system that provides medical care providers with a weight based pediatric syringe system to accurately deliver

drugs and/or medications during cardiac arrests or emergency care settings, thus saving lives.

5 It is another object of this invention to provide a weight based pediatric syringe system that accurately determines a volume of a drug and/or medication to be administered to a patient.

10 It is another object of this invention to provide a weight based pediatric syringe system that allows for easy visibility of kilogram marks, allowing healthcare providers to dose patients of different weight accurately.

15 It is another object of this invention to provide a weight based pediatric syringe system that associates sizes and scale, to the uniqueness of each syringe to each specific drug and/or medication. It will result in syringes with varying barrel diameters and length to create an easy to view graduation.

20 It is another object of this invention to provide a weight based pediatric syringe system comprising system-wide color codes that match existing drugs and/or medications in the market on the plunger and barrel of the syringe for easy identification.

25 It is another object of this invention to provide a weight based pediatric syringe system that has written on the syringe's plunger and/or barrel the drug and/or medication concentration indicated for its application according to each specific patient weight.

It is another object of this invention to provide a weight based pediatric syringe system that is created to match any weight based application for a wide range of drugs and/or medications from cardiac arrest, seizure, sedation or cardiac arrhythmia.

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It is another object of this invention to provide a weight based pediatric syringe system that is volumetrically efficient for carrying, transporting, and storage.

10 It is another object of this invention to provide a weight based pediatric syringe system that can be readily assembled and disassembled without the need of any special tools.

It is another object of this invention to provide a weight based
15 pediatric syringe system, which is of a durable and reliable construction.

It is yet another object of this invention to provide such a device that is inexpensive to manufacture and maintain while retaining
20 its effectiveness.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing
25 limitations thereon.

V. BRIEF DESCRIPTION OF THE DRAWINGS

With the above and other related objects in view, the invention consists in the details of construction and combination of parts as will be more fully understood from the following description, when read in conjunction with the accompanying drawings in which:

Figure 1 represents an isometric view of a weight based pediatric syringe system having a luer lock assembly, object of the present application.

Figure 2 represents an isometric view of the weight based pediatric syringe system seen in Figure 1, but having an alternate scale embodiment.

Figure 3 represents an isometric view of a weight based pediatric syringe system having a needle assembly.

Figure 4 represents an isometric view of an epinephrine specific weight based pediatric syringe system having a luer lock assembly.

Figure 5 represents an isometric view of an amiodarone specific weight based pediatric syringe system having a luer lock assembly.

VI. DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, the present invention is a weight
5 based pediatric syringe system and is generally referred to with
numeral **10**. It can be observed that it basically includes plunger
12 and barrel **14**.

As seen in figure 1, present invention **10** is a pump consisting of
10 plunger **12** that fits tightly in barrel **14**. Plunger **12** comprises an
end fitting, piston and plunger seal. Plunger **12** can be pulled and
pushed along inside barrel **14**, allowing present invention **10** to
take in and expel a liquid or gas through an orifice at the open
end of barrel **14**. Barrel **14** typically comprises a flange as
15 illustrated. The open end of barrel **14** may be fitted with luer lock
assembly **17**, a nozzle, or tubing to help direct the flow into and
out of barrel **14**. In a preferred embodiment, present invention **10**
is used to administer injections, insert intravenous drugs and/or
medications into the bloodstream of a patient. In a preferred
20 embodiment, barrel **14** comprises units of volume scale **20** and
units of mass scale **22**.

As seen in figure 2, in an alternate embodiment, barrel **14**
comprises units of volume/mass scale **21**.

25 As seen in figure 3, the open end of barrel **14** may instead be
fitted with tip **16** having hypodermic needle **18** to help direct the
flow into and out of barrel **14** when administering injections, and

inserting intravenous drugs and/or medications into the bloodstream of the patient. Tip **16** may be, or comprise, a needle attachment, and/or adaptor.

- 5 Present invention **10** is designed to accurately graduate a volume of drugs and/or medications with a specific concentration to be administered, whereby the units of volume in units of volume scale **20** are directly proportionate to the units of mass in units of mass scale **22**, based on a mass of the patient. In addition,
- 10 units of volume scale **20**, units of mass scale **22**, and units of volume/mass scale **21** allow for easy visibility of kilogram marks allowing a healthcare provider to dose a 1 kg patient as accurately as a 40 kg patient as an example.
- 15 Furthermore, a unique relationship of present invention **10** to a specific drug and/or medication will result in varying barrel **14** diameters and length to create an easy to view graduation.

In a preferred embodiment, units of volume may be cubic

20 centimeters, which is the same volume as the milliliter (mL or ml). A cubic centimeter (International System of Units (SI) unit symbol: cm³; non-SI abbreviations: cc and ccm) is a commonly used unit of volume that extends the derived SI-unit cubic meter, and corresponds to the volume of a cube that measures 1 cm × 1

25 cm × 1 cm. One cubic centimeter corresponds to a volume of 1/1,000,000 of a cubic meter, or 1/1,000 of a liter, or one milliliter; thus, 1 cm³ = 1 ml. Many scientific fields have

replaced cubic centimeters with milliliters. The medical fields in the United States still use the term cubic centimeter.

In a preferred embodiment, units of mass may be kilogram or
5 kilogramme (SI unit symbol: kg; SI dimension symbol: M), which is the base unit of mass in the SI Metric system and is defined as being equal to the mass of the International Prototype of the Kilogram (IPK). The avoirdupois, or international, pound, used in
10 both the Imperial system and U.S. customary units, is defined as exactly 0.45359237 kg, making one kilogram approximately equal to 2.2046 avoirdupois pounds. Other traditional units of weight and mass around the world are also defined in terms of the kilogram, making the IPK the primary standard for virtually all units of mass on Earth.

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In a preferred embodiment, barrel **14** is color-coded to match a drug and/or medication label color code for easy identification. As an example, barrel **14** can be tan in color to match a specific drug and/or medication tan label color code such as epinephrine
20 1:10,000. Optionally, plunger **12** can also be tan in color to match its respective barrel **14** and the drug and/or medication tan label color code.

As another example, barrel **14** can be pink in color to match a
25 specific drug and/or medication pink label color code such as epinephrine 1:1,000. Optionally, plunger **12** can also be pink in color to match its respective barrel **14** and the drug and/or medication pink label color code.

As another example, barrel **14** can be maroon in color to match a specific drug and/or medication maroon label color code such as amiodarone 50 mg/cc concentration. Optionally, plunger **12** can also be maroon in color to match its respective barrel **14** and the drug and/or medication maroon label color code.

Therefore, present invention **10** is medication specific meaning that each weight based pediatric syringe system is specific to a particular drug and/or medication concentration. As an example, drugs and/or medications administered with present invention **10**, can be, but are not limited to treat: cardiac arrest, seizure, sedation, and/or cardiac arrhythmia.

In another embodiment, barrel **14** is marked with a specific drug and/or medication for administration of that specific drug and/or medication. Meaning that relevant drug and/or medication information, including concentration, is placed onto barrel **14** itself. The relevant drug and/or medication information can be placed on a sticker, engraved, or otherwise placed thereon, as an example. Optionally, plunger **12** is also marked with the specific drug and/or medication for administration of said specific drug and/or medication.

Seen in figure 4 is an example of weight based pediatric syringe system **10** in use, the units of volume to units of mass for epinephrine 1:10,000 is 0.1 cc/kg or equivalent units of volume and units of mass thereof.

Seen in figure 5 is another example of weight based pediatric syringe system **10** in use, the units of volume to units of mass for amiodarone 50 mg/cc concentration is 0.1 cc (5 mg/kg) or equivalent units of volume and said units of mass thereof. These two drugs are the primary drugs for cardiac arrest set by American Heart Association.

Another example of weight based pediatric syringe system **10** in use, Adenosine, which comes in 3 mg/cc concentration and has a initial dosing of 0.1 mg/kg up to max of 6 mg, which is the adult dose. Subsequent Adenosine dosing is 0.2 mg/kg up to the maximum adult dose, which is 12 mg.

Another example of weight based pediatric syringe system **10** in use, Atropine, which comes in 1 mg/10 cc is dosed at 0.02 mg/kg with minimum dose starting at 0.1 mg up to a max dose of 0.5 mg.

Another example of weight based pediatric syringe system **10** in use, Calcium Chloride 10%, which comes in a concentration of 1 GM/10 cc or 100 mg/cc is dosed at 20 mg/kg.

Another example of weight based pediatric syringe system **10** in use, Sodium Bicarbonate 8.4%, which comes in a concentration of 1 mEq/cc is dosed at 1 mEq/kg.

Another example of weight based pediatric syringe system **10** in use, Sodium Bicarbonate 4.2%, which comes in a concentration of 0.5 mEq/cc is dosed at 1 mEq/kg.

- 5 Another example of weight based pediatric syringe system **10** in use, Midazolm, which comes in a concentration of 1 mg/cc is dosed at 0.1 mg/kg with max dosing not exceeding 2 mg to 2.5 mg depending on regional medical direction.
- 10 Another example of weight based pediatric syringe system **10** in use, Diazepam, which comes in a 5 mg/cc concentration is dosed at 0.2 mg/kg and max dosing is at the adult dose of 5 mg.

Present invention **10** may be utilized on any human. However, in a
15 preferred embodiment, the patient is under 50 kg. Present invention **10** comprising units of volume scale **20**, units of mass scale **22**, or units of volume/mass scale **21** providing weight based administration of given drugs and/or medications, at system wide standard concentrations, is ground breaking in
20 pediatric medicine. Present invention **10** allows a provider everything they need to deliver the drugs and/or medications accurately in emergency care settings including cardiac arrest. Differentiation between adult and weight based pediatric dosing is considered nationally by either meeting minimum weight set by
25 American Heart Association or minimum age. Also this differs under different medical direction in which doctors may create their own cut off for that region or system.

The foregoing description conveys the best understanding of the objectives and advantages of the present invention. Different embodiments may be made of the inventive concept of this invention. It is to be understood that all matter disclosed herein is
5 to be interpreted merely as illustrative, and not in a limiting sense.

VII. INDUSTRIAL APPLICABILITY

It is evident that an invention such as the weight based pediatric
10 syringe system claimed in the present application is quite desirable because it is an accurately graduated syringe, with markers indicating weight-based administration of a given drug and/or medication, at system-wide standard concentrations. Also, the present invention is quite desirable because it provides
15 medical care providers with a weight based pediatric syringe system to accurately deliver drugs and/or medications during cardiac arrests or emergency care settings, thus saving lives and accurately determines a volume of a drug and/or medication to be administered to a patient. The present invention allows for easy
20 visibility of kilogram marks, allowing healthcare providers to dose patients of different weight accurately because it associates sizes and scale, to the uniqueness of each syringe to each specific drug and/or medication, which will result in syringes with varying barrel diameters and length to create an easy to view graduation.
25 Furthermore, the present invention is quite desirable because it comprises system-wide color codes that match existing drugs and/or medications in the market on the plunger and barrel of the syringe for easy identification. Additionally, the present invention

has written on the syringe's plunger and/or barrel the drug and/or medication concentration indicated for its application according to each specific patient weight, created to match any weight based application for a wide range of drugs and/or medications from cardiac arrest, seizure, sedation or cardiac arrhythmia. The present invention is volumetrically efficient for carrying, transporting, and storage, can be readily assembled and disassembled without the need of any special tools, is of a durable and reliable construction, and inexpensive to manufacture and maintain while retaining its effectiveness.

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VIII. CLAIMS

What is claimed is:

- 5 **1.** A weight based pediatric syringe system, consisting of a syringe having a barrel, said barrel comprising at least one scale having units of volume and units of mass, said syringe further comprises a plunger, a needle, and a luer lock system, designed to accurately graduate a volume of drugs or medications with a
10 specific concentration to be administered, whereby said units of volume are directly proportionate to said units of mass based on a mass of a patient, said barrel and said plunger are color-coded to match a drug specific or medication specific label color code, and said barrel and said plunger are also marked with a specific drug
15 or medication for administration of said specific drug or medication.
- 20 **2.** The weight based pediatric syringe system set forth in claim **1**, wherein said drugs or medications specifically treat cardiac arrest, seizure, sedation, or cardiac arrhythmia.
- 25 **3.** The weight based pediatric syringe system set forth in claim **1**, wherein said at least one scale having said units of volume is in cubic centimeters.
- 30 **4.** The weight based pediatric syringe system set forth in claim **1**, wherein said at least one scale having said units of volume is in milliliters.

5. The weight based pediatric syringe system set forth in claim **1**, wherein said at least one scale having said units of mass is in kilograms.

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6. The weight based pediatric syringe system set forth in claim **1**, wherein said at least one scale having said units of mass is in pounds.

10 **7.** The weight based pediatric syringe system set forth in claim **1**, wherein said units of volume to units of mass for epinephrine 1:10,000 is 0.1 cc/kg or equivalent said units of volume and said units of mass thereof.

15 **8.** The weight based pediatric syringe system set forth in claim **1**, further characterized in that wherein said units of volume to units of mass for amiodarone 50 mg/cc concentration is 0.1 cc (5 mg/kg) or equivalent said units of volume and said units of mass thereof.

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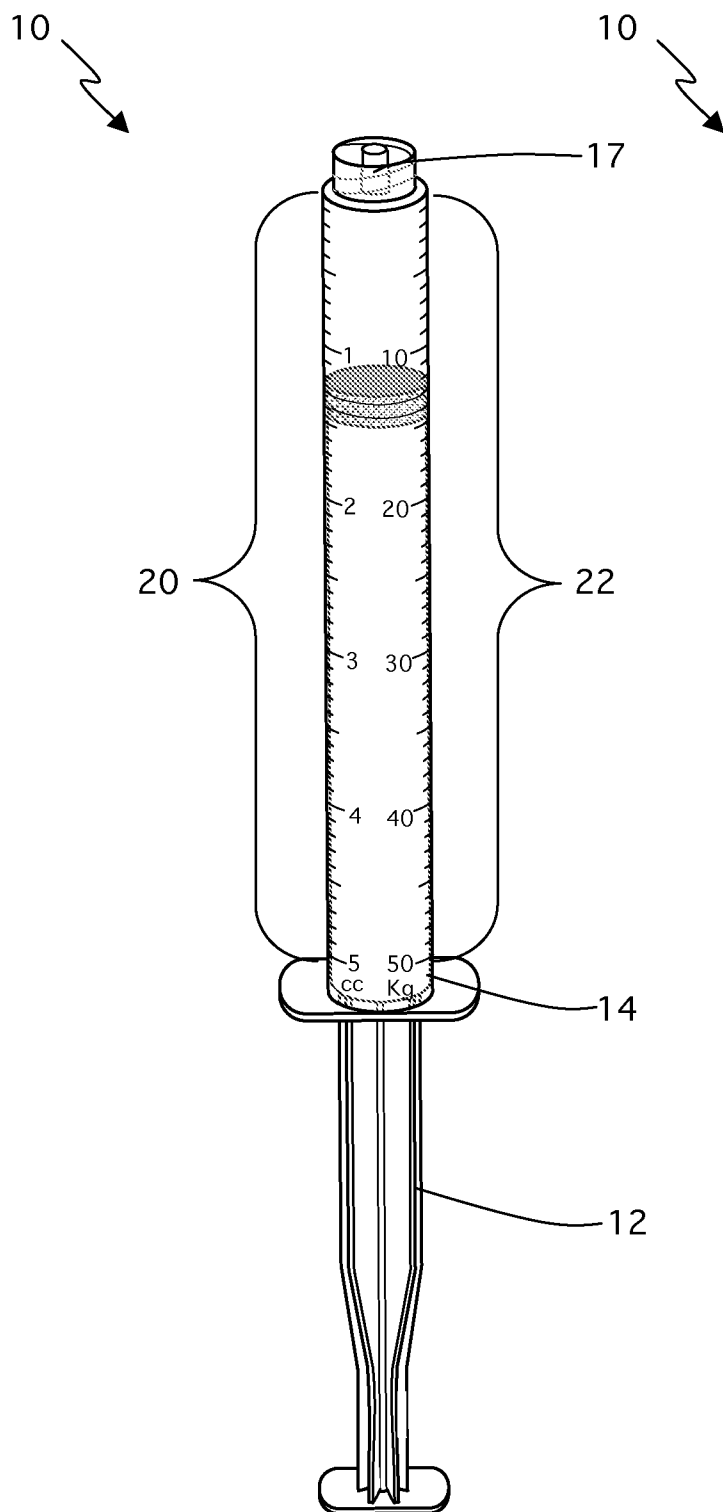


Fig. 1

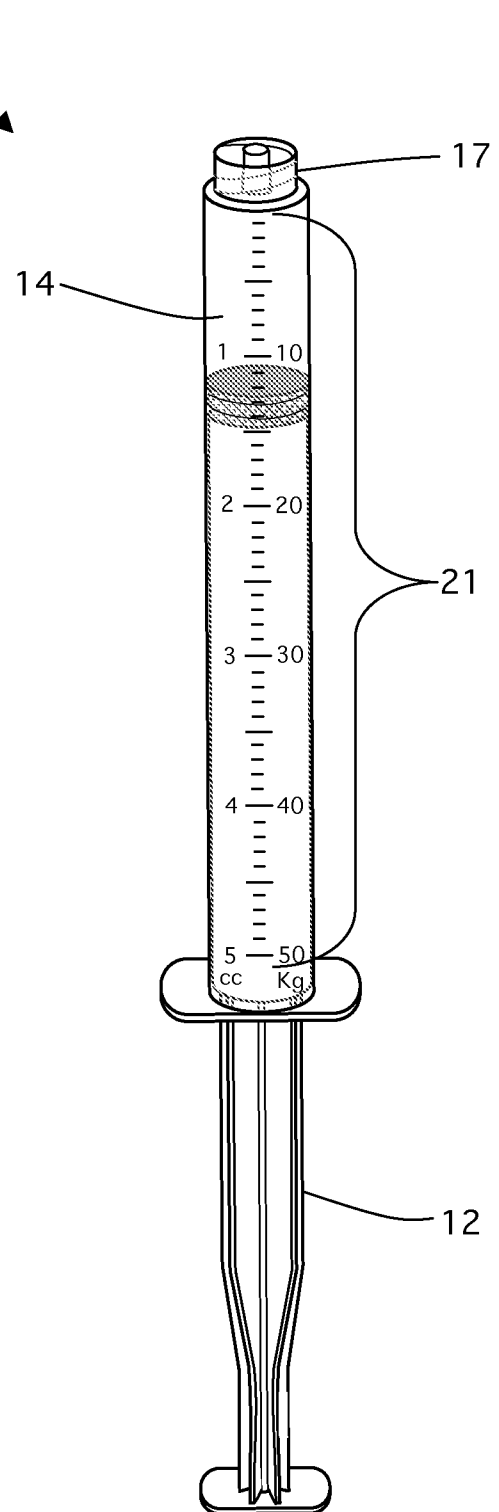


Fig. 2

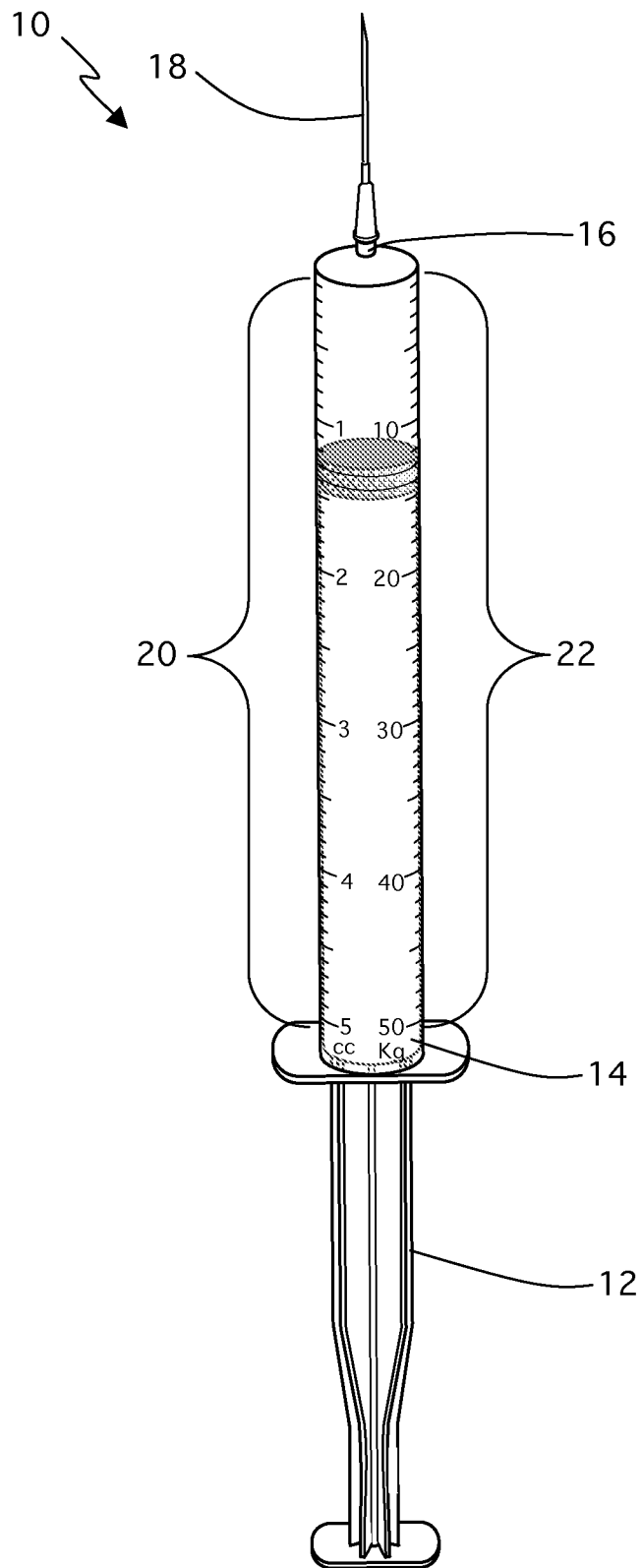


Fig. 3

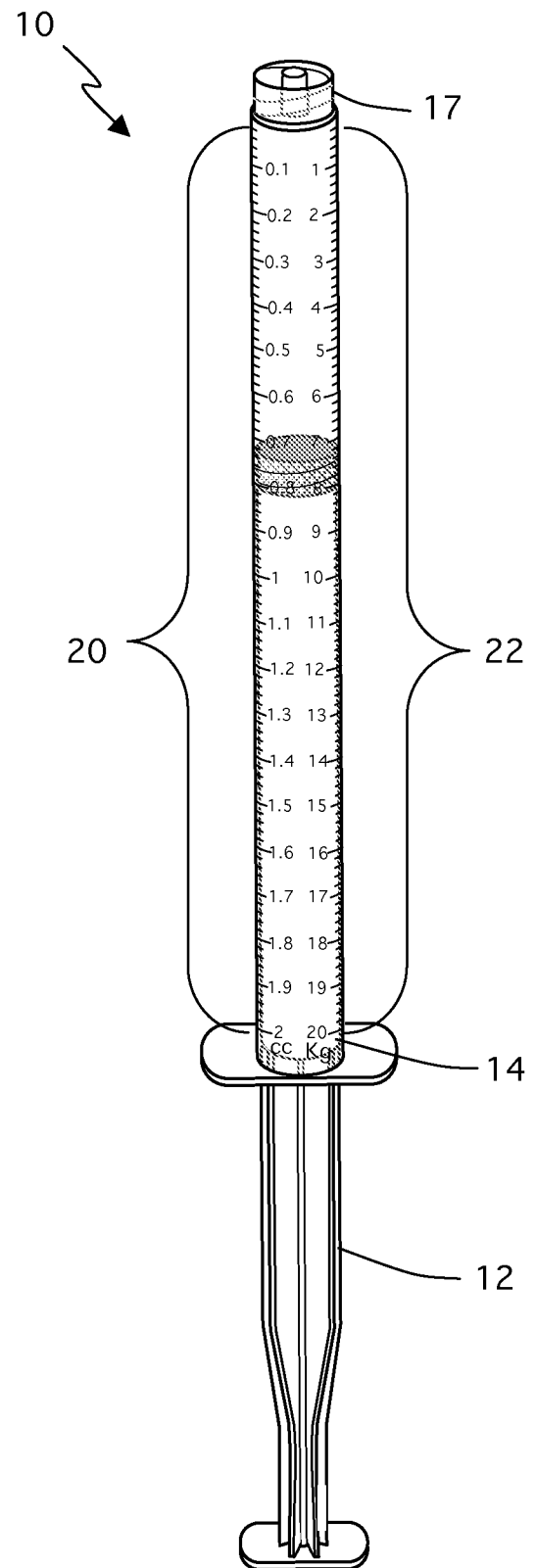


Fig. 4

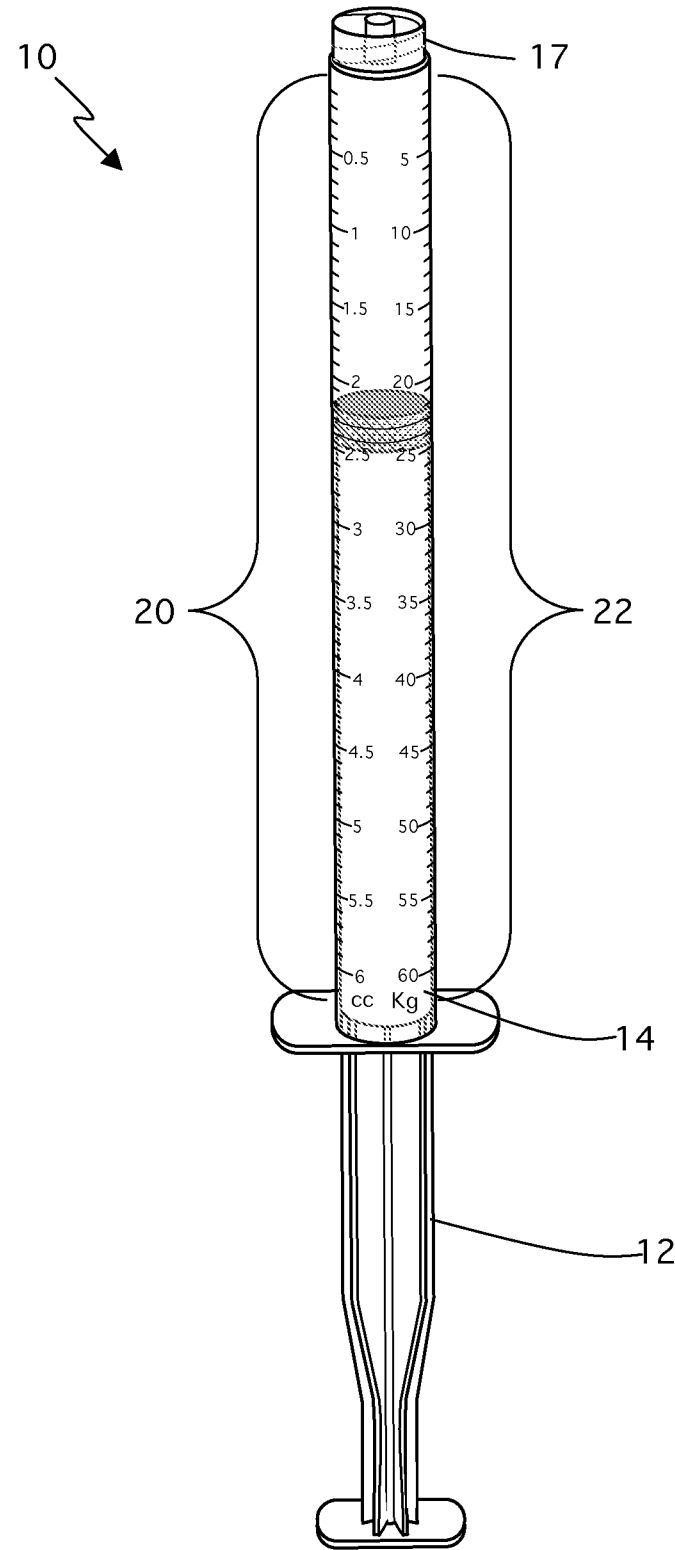


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 15/52964

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - A61M 5/178 (2015.01) CPC - A61M 2005/3125, A61M 2005/3126, A61M 2205/58, A61M 2205/584, A61M 2205/6081 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC(8) - A61M 5/178 (2015.01) CPC - A61M 2005/3125, A61M 2005/3126, A61M 2205/58, A61M 2205/584, A61M 2205/6081 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched UPC: 604/189; CPC: A61M 5/31*, 2005/31*, A61M 2205/583, A61M 2205/6009, A61M 2205/6063; A61M 2205/60*, A61M 5/178*, 5/19, 5/20*, 2005/20*, 5/24*, 2005/24*, 5/28*, 2005/28*, 5/30*, 2005/30*, 5/31*, 2005/31*, 5/32*, 2005/32* (Search term limited; see below) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWest (PGPB, USPT, EPAB, JPAB); Google; PatBase (All); Search Terms: Syringe, pediatric, infant, scale, marking, graduation, graduated, tick marks, indicator, weight, mass, kilogram, gram, pound, lb, milligram, mg, kg, volume, liter, milliliter, cubic centimeter, centiliter, deciliter, ml, cl, dl, cc, both, combined, combination, barrel,		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2013/0204225 A1 (CREATURO) 08 August 2013 (08.08.2013) Entire document, especially Abstract, para[0042]- para[0045], para[0061]- para[0062], para[0070]- para[0072] and FIGS. 4-5.	1-8
Y	"Color-Coded Syringes: A System for Sleep-Deprived Parents" (Complex Child E-Magazine) 19 March 2012 (19.03.2012) [online], retrieved from the internet: <URL: http://articles.complexchild.com/april2012/00374.html > entire document, especially pg. 1, figs. 1-2.	1-8
A	US 2009/0143745 A1 (LANGAN et al.) 04 June 2009 (04.06.2009) Entire document,	1-8
A	US 2009/0264815 A1 (GROGAN, JR) 22 October 2009 (22.10.2009) Entire document.	1-8
A	US 2002/0087121 A1 (SLISHMAN) 04 July 2002 (04.07.2002) Entire document.	1-8
A	US D545,429 S1 (HAYS) 26 June 2007 (26.06.2007) Entire document.	1-8
A	US 6,132,416 A (BROSELOW) 17 October 2000 (17.10.2000) Entire document.	1-8
A,P	WO 2015/025300 A2 (APPELBAUM) 26 February 2015 (26.02.2015) Entire document.	1-8
☐ Further documents are listed in the continuation of Box C. ☐		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300		Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774